

ABSTRACT

A Catadioptric Light Distribution System is disclosed. The system collects and collimates the hemispherical pattern of light emitted by a Lambertian light emitting diode (LED) into a collimated beam directed essentially parallel to the optical axis of the LED. The system comprises a circular condensing lens having a center axis that is aligned with the optical axis of the LED and which is configured to receive and collimate a portion of the light from the LED defined by a central cone of light centered around the optical axis. A parabolic reflector having circular opening formed therethrough is centered on the center axis of the parabolic reflector and is positioned around the LED to receive and redirect the light which does not form the cone that impinges upon the condensing lens in a collimated annular beam in a direction away from the condensing lens. The light reflected and culminated by the parabolic reflector is directed onto a circular annular double bounce mirror which is configured and positioned to receive the annular beam from the parabolic reflector and reflect that beam of light 180° so that it is collimated in an annular beam which passes around the edge of the condensing lens. Thus, substantially all the light emitted by the LED is culminated into a beam of light that is substantially parallel to the optical axis of the LED by either the condensing lens or by the combination of the parabolic reflector and the double bounce mirror.

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